Claims

1. A process for preparing coated crystals comprising the steps:
   (a) providing a dispersion of crystal template particles in a solvent and
   (b) coating said particles with a multilayer comprising alternating layers of oppositely charged polyelectrolytes and/or nanoparticles.

2. The process of claim 1, wherein said crystal template particles are bio-crystals.

3. The process of claim 1 or 2, wherein said crystal particles are protein crystals, peptide crystals, nucleic acid crystals, lipid based crystals, carbohydrate crystals or crystals from low molecular weight materials.

4. The process of claim 3, wherein said protein crystals are selected from antibody crystals, enzyme crystals, virus capsid protein crystals, S-layer protein crystals, glycoprotein crystals, receptor protein crystals and cytosolic protein crystals.

5. The process of claim 1, wherein said crystal template particles are selected from the group consisting of crystalline bio-material, crystalline organic material, crystalline inorganic material or mixtures thereof.

6. The process of claim 5, wherein the crystalline or organic material is selected from crystalline drugs, crystalline vitamins, crystalline nutrients, crystalline hormones, crystalline growth factors, crystalline pesticides and crystalline antibiotics.

7. The process of ~~any one of claims 1 to 6~~ claim 1, wherein the crystal template is a single crystal material or an amorphous crystal material.

8. The process of ~~any of claims 1 to 7~~ claim 1, wherein said template particles have an average diameter of 500 μm or less.

9. The process of claim 8, wherein said template particles have an average diameter of 50 μm or less.

10. The process of ~~any one of claims 1 to 9~~ claim 1, wherein said polyelectrolytes are linear molecules.

11. The process of ~~any one of claims 1 to 10~~ claim 1, wherein said polyelectrolytes are selected from inorganic, organic and biological polyelectrolytes and mixtures thereof.

12. The process of claim 10, wherein the organic polyelectrolyte is a polymer selected from biodegradable polymers, fluorescently labelled polymers, conducting polymers, liquid crystal polymers, photoconducting polymers, photochromic polymers, and copolymers and/or mixtures thereof.

13. The process of claim 10, wherein the biological polyelectrolyte is a polymer selected from polyamino acids, polycarbohydrates, polynucleotides and modified biopolymers.

14. The process of claim 10, wherein the inorganic polyelectrolyte is a polymer based on polysilanes, polysilanoles, polyphosphazanes, polysulfazenes, polysulfides and polyphosphates.

15. The process of ~~any one of claims 1 to 14~~ claim 1, wherein said nanoparticles have an average diameter of from 1 to 100 nm.

16. The process of ~~any one of claims 1 to 15~~ Claim 1, wherein said nanoparticles are selected from inorganic, organic and biological particles or mixtures thereof.

17. The process of claim 16, wherein said nanoparticles are selected from particles which provide targeting properties.

18. The process of claim 16 or 17, wherein said nanoparticles are particles having magnetic properties.

19. The process of claim 16 or 17, wherein said nanoparticles are immunoglobulins or receptor ligands.

20. The process of any one of claims 16 to 19, wherein the inorganic nanoparticles are ceramic particles, magnetic particles, magneto-optical particles, nitridic ceramic particles, carbidic ceramic particles, metallic particles, and/or sulfur or selenium-containing particles.

21. The process of any one of claims 16 to 19, wherein the organic or biological nanoparticles are macromolecules and/or targeting molecules.

22. The process of ~~any one of the preceding claims~~ Claim 1, wherein said solvent is selected from aqueous solvents, organic solvents and mixed aqueous/organic solvents.

23. The process of ~~any one of the preceding claims~~ Claim 1 further comprising the step:

(c) at least partially solubilizing the encapsulated crystals.

24. The process of claim 23, wherein said solubilization is carried out by adjustment of solvent, pH, temperature and/or salt conditions.

25. The process of ~~any one of the preceding~~ claim 1 claims further comprising the step:

(d) rupturing the polyelectrolyte/nanoparticle shell.

26. The process of ~~any one of the claims 1 to 24~~ claim 1 further comprising the step:

(e) at least partially disintegrating encapsulated biomolecules.

27. Coated particle having a core which is a crystal template particle and a multilayer shell comprising alternating layers of oppositely charged polyelectrolytes and/or nanoparticles.

28. Coated particle having a core comprising an at least partially solubilized crystal template particle and a multilayer shell comprising alternating layers of oppositely charged nanoparticles and/or polyelectrolytes.

29. The particle of claim 27 or 28 having an average diameter of 50 μm or less.

30. Hollow shell obtainable by disintegrating the template particle of the coated particle of claim 27, 28 or 29.

31. Use of the particle according to any one of claims 27 to 29 as a system for targeted delivery and/or controlled release of crystallizable biomolecules.